


Form PTO-1390 U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE (REV 10-95)		ATTORNEY'S DOCKET NUMBER 3135-011614
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371		U.S. APPLICATION NO. (If known, see 37 CFR 1.5) 09/937460
INTERNATIONAL APPLICATION NO. PCT/NL00/00202	INTERNATIONAL FILING DATE 24.03.2000 (March 24, 2000)	PRIORITY DATES CLAIMED 24.03.99 (March 24, 1999)
TITLE OF INVENTION DEVICE AND METHOD FOR SELECTING AND RECORDING AN IMAGE		
APPLICANT(S) FOR DO/EO/US Pieter Tjerk KOOPMAN		
<p>Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:</p> <ol style="list-style-type: none"> <input checked="" type="checkbox"/> This is a FIRST submission of items concerning a filing under 35 U.S.C. 371. <input type="checkbox"/> This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371. <input checked="" type="checkbox"/> This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1). <input checked="" type="checkbox"/> A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371(c)(2)) <ol style="list-style-type: none"> <input type="checkbox"/> is transmitted herewith (required only if not transmitted by the International Bureau). <input checked="" type="checkbox"/> has been transmitted by the International Bureau. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US). <input type="checkbox"/> A translation of the International Application into English (35 U.S.C. 371(c)(2)). <input checked="" type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)) <ol style="list-style-type: none"> <input type="checkbox"/> are transmitted herewith (required only if not transmitted by the International Bureau). <input type="checkbox"/> have been transmitted by the International Bureau. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired. <input checked="" type="checkbox"/> have not been made and will not be made. <input type="checkbox"/> A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)). <input type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)). <input type="checkbox"/> A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)). <p>Items 11. to 16. below concern document(s) or information included:</p> <ol style="list-style-type: none"> <input type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98. <input type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included. <input checked="" type="checkbox"/> A FIRST preliminary amendment together with retyped specification pages 1-3a. <ul style="list-style-type: none"> <input type="checkbox"/> A SECOND or SUBSEQUENT preliminary amendment. <input type="checkbox"/> A substitute specification. <input type="checkbox"/> A change of power of attorney and/or address letter. <input checked="" type="checkbox"/> Other items or information: <ol style="list-style-type: none"> WO 00/57234-Front Page with Abstract, Specification, Claims, Drawings and Search Report (18 pp.) 		

U.S. APPLICATION NO. 09/937460		INTERNATIONAL APPLICATION NO. PCT/NL00/00202		ATTORNEY'S DOCKET NUMBER 3135-011614	
17. <input checked="" type="checkbox"/> The following fees are submitted: BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(5)): Search Report has been prepared by the EPO or JPO..... \$860.00 International preliminary examination fee paid to USPTO (37 CFR 1.482) \$690.00 No international preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee paid to USPTO (37 CFR 1.445(a)(2))..... \$710.00 Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO..... \$1,000.00 International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4)..... \$100.00 ENTER APPROPRIATE BASIC FEE AMOUNT =				CALCULATIONS PTO USE ONLY	
Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input checked="" type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e))				\$ 130.00	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	21 - 20	1	X \$18.00	\$ 18.00	
Independent claims	2 - 3 =	0	X \$78.00	\$ 0.00	
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ \$260.00	\$ 0.00	
TOTAL OF ABOVE CALCULATIONS =				\$ 1,008.00	
Reduction of 1/2 for filing by small entity, if applicable. Verified Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28).				\$ 0.00	
SUBTOTAL =				\$ 1,008.00	
Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				\$ 0.00	
TOTAL NATIONAL FEE =				\$ 1,008.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) \$40.00 per property				\$ 0.00	
TOTAL FEES ENCLOSED =				\$ 1,008.00	
				Amount to be: refunded	\$
				charged	\$
a. <input checked="" type="checkbox"/> A check in the amount of \$ 1,008.00 to cover the above fees is enclosed. b. <input type="checkbox"/> Please charge my Deposit Account No. _____ in the amount of \$ _____ to cover the above fees. A duplicate copy of this sheet is enclosed. c. <input checked="" type="checkbox"/> The Assistant Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. <u>23-0650</u> . A duplicate copy of this sheet is enclosed.					
NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.					
SEND ALL CORRESPONDENCE TO: John W. McIlvaine 700 Koppers Building 436 Seventh Avenue Pittsburgh, Pennsylvania 15219-1818 Telephone: (412) 471-8815 Facsimile: (412) 471-4094				 SIGNATURE John W. McIlvaine NAME 34,219 REGISTRATION NUMBER	

no/937460

JCO3 Rec'd PCT/TO 24 SEP 2001

PATENT APPLICATION/PCT
Attorney Docket 3135-011614

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of :
Pieter Tjerk KOOPMAN : **DEVICE AND METHOD FOR**
: **SELECTING AND RECORDING**
International Application : **AN IMAGE**
No. PCT/NL00/00202 :
International Filing Date :
24 March 2000 :
Priority Date Claimed :
24 March 1999 :
Serial No. Not Yet Assigned :
Filed Concurrently Herewith :
Pittsburgh, Pennsylvania
September 24, 2001

PRELIMINARY AMENDMENT

BOX PCT

Commissioner for Patents
Washington DC 20231

Sir:

Prior to initial examination, please amend the above-identified patent application
as follows:

IN THE SPECIFICATION:

On page 1, at line 1, delete the title and insert the title as follows:

DEVICE AND METHOD FOR SELECTING AND RECORDING AN IMAGE

Please insert section headings.

On page 1, after the title, please insert the following section headings:

BACKGROUND OF THE INVENTION

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1. Field of the Invention

On page 1, at line 6, please insert the following section heading:

2. Brief Description of the Prior Art

On page 1, at line 22, please insert the following section heading:

SUMMARY OF THE INVENTION

On page 2, please delete the paragraph starting at line 19 and insert the following replacement paragraph:

In a particular preferred embodiment the displaceable camera is rotatable around two rotation axes substantially perpendicular to each other. The mirror can herein be disposed in stationary position. A selection can thus be made by directing the camera at the desired part of the reflected image of the object. The required angular displacement of the camera can be determined partly subject to the distance of the camera from the mirror. By means of this simple construction a part of the image of the object can be viewed without loss of image quality.

On page 2, please delete the paragraph starting at line 27 and insert the following replacement paragraph:

In another preferred embodiment the mirror is rotatable around a single rotation axis for the purpose of reflecting a chosen part of the image of the object to a viewing area. In preference the camera is herein moreover displaceable in the viewing area substantially parallel to the rotation axis of the rotatable mirror. A desired part of the image of the object can also be selected with this preferred embodiment of the device according to the invention. The control of the camera is herein simpler than the control of the above described camera with two rotation axes since it has only one degree of freedom. In addition to simpler control of the camera, the mirror must however also be controlled in this preferred variant.

On page 5, please delete the paragraph starting at line 8 and insert the following replacement paragraph:

In a preferred application of the method according to the invention the part of the reflected image to be viewed is selected by rotating the camera around two rotation axes substantially perpendicular to each other. A desired part of the image of an object reflected by means of a for instance stationary mirror can thus be selected by limited angular displacement of the camera through two degrees of freedom. Selection takes place solely by directing the camera.

On page 5, please delete the paragraph starting at line 15 and insert the following replacement paragraph:

In another preferred application of the method according to the invention for reflecting an image of an object as according to step B), the mirror is rotated around a single rotation axis such that a selected part of the image of the object is reflected by the mirror to a viewing area. The part to be viewed from the reflected image is preferably selected by displacing the camera substantially parallel to the rotation axis of the mirror in the viewing area. The desired part of the image is thus selected by rotating the mirror and displacing the camera. Although two elements have to be directed here, both have only to be displaced/rotated along one degree of freedom. The image of the object to be reflected to the viewing area can herein also be reflected by at least one stationary mirror as well as by the rotatable mirror. For the other advantages of this method reference is made to the advantages described above with reference to the device according to the invention.

On page 5, please delete the paragraph starting at line 28.

On page 5, before the paragraph beginning at line 30, please insert the following section heading:

BRIEF DESCRIPTION OF THE DRAWINGS

On page 5, please delete the paragraph starting at line 30 and insert the following replacement paragraph:

Figure 1a is a schematic side view of a device according to the invention;

On page 6, please delete the paragraph starting at line 1 and insert the following replacement paragraph:

Figure 1b is a side view rotated through 90° relative to Figure 1a of the schematically shown device corresponding with that of Figure 1a;

On page 6, please delete the paragraph starting at line 3 and insert the following replacement paragraph:

Figure 2a is a side view of a rotatable mirror and translatable camera such as form part of the device according to the invention; and

On page 6, please delete the paragraph starting at line 5 and insert the following replacement paragraph:

Figure 2b is a side view rotated through 90° of the camera and mirror as shown in Figure 2a.

On page 6, at line 7, please insert the following section heading:

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

On page 6, please delete the paragraph starting at line 8 and insert the following replacement paragraph:

Figure 1a shows a device 1 with an object holder 2 from which light is cast as according to arrow P1. The light emitted by object holder 2 is radiated to a stationary mirror 3 by an object (not shown in this figure) placed on object holder 2. Stationary mirror 3 reflects the

light to a rotatable mirror 4 which can swivel around a rotation axis 5 which coincides with the mirror surface of mirror 3. From rotatable mirror 4 a part of the light image reflects to a camera 6 which is displaceable along a guide 7 in a viewing area in a direction perpendicular to the drawing. Object holder 2, mirrors 3, 4 and camera 6 are placed in a housing 8 which prevents light emitted by object holder 2 disturbing/impeding users of device 1. The housing 8 shown schematically in this figure also forms the frame on which rotation axis 5 engages via a support 9 and to which stationary mirror 3 is connected via a support 10.

On page 6, please delete the paragraph starting at line 26 and insert the following replacement paragraph:

Figure 2a shows a more detailed side view of device 1 in which rotatable mirror 4 is suspended for rotation around pins 11 in a frame 12. Also fixed to frame 12 is an electric motor 13 which engages on rotatable mirror 4 via ball hinges 14 and a drive rod 15. It is thus possible by operating servomotor 13 to vary the angular position of rotatable mirror 4. Figure 2b shows clearly that rotatable mirror 4 is likewise integrated with frame 12 via a support 16.

IN THE CLAIMS:

Please cancel original claims 1-21 and rewrite them as new claims 22-42 as follows:

22. A device for selecting and recording an image which forms a part of an irradiated or emissive object, comprising:

an object holder for positioning the object,

a mirror for reflecting an image of the object, and

a displaceable camera for selecting a part of the image from the reflected image of the object.

23. The device as claimed in claim 22, wherein the displaceable camera is rotatable around two rotation axes substantially perpendicular to each other.

24. The device as claimed in claim 22, wherein the mirror is rotatable around a single rotation axis for the purpose of reflecting a chosen part of the image of the object to a viewing area.

25. The device as claimed in claim 24, wherein the camera is displaceable in the viewing area substantially parallel to the rotation axis of the rotatable mirror.

26. The device as claimed in claim 22, wherein the device also comprises a radiation source for irradiating the object positioned by the object holder.

27. The device as claimed in claim 22, wherein the object holder takes a stationary form.

28. The device as claimed in claim 26, wherein the radiation source is disposed on the side of the object remote from the mirror.

29. The device as claimed in claim 24, wherein the device also comprises drive means for rotating the mirror.

30. The device as claimed in claim 22, wherein the device also comprises drive means for displacing the camera.

31. The device as claimed in claim 25, wherein the device also comprises substantially linear guide means for guiding the camera.

32. The device as claimed in claim 22, wherein the device is provided with an at least substantially radiation-sealed housing.

33. The device as claimed in claim 24, wherein the rotatable mirror has an elongate form.

34. The device as claimed in claim 24, wherein the rotatable mirror, rotatable axis and a drive means for rotation of the mirror are integrated with the camera.

35. The device as claimed in claim 24, wherein at least one stationary mirror is disposed between the object and the camera in addition to the rotatable mirror.

36. A method for selecting an image to be recorded with a camera which forms a part of an irradiated or emissive object, by the steps of:

- A) placing the object in stationary position,
- B) reflecting an image of an object with a mirror, and
- C) selecting with a displaceable camera a part of the image of the object to be viewed from the reflected image.

37. The method as claimed in claim 36, wherein the part of the reflected image to be viewed is selected by rotating the camera around two rotation axes substantially perpendicular to each other.

38. The method as claimed in claim 36, wherein in order to reflect an image of an object as according to step B) the mirror is rotated around a single rotation axis such that a selected part of the image of the object is reflected by the mirror to a viewing area.

39. The method as claimed in claim 38, wherein the part to be viewed from the reflected image is selected by displacing the camera substantially parallel to the rotation axis of the mirror in the viewing area.

40. The method as claimed in claim 36, wherein the object placed in stationary position is irradiated with a radiation source.

41. The method as claimed in claim 38, wherein the part of the image of the object to be reflected to the viewing area is also reflected by at least one stationary mirror as well as by the rotatable mirror.

42. The method as claimed in claim 36, wherein the object is irradiated from the side of the object remote from the mirror.

IN THE ABSTRACT:

After the claims, please insert a page containing the Abstract Of The Disclosure, which is attached hereto as a separately typed page.

REMARKS

The specification has been amended by this Preliminary Amendment to place the application in conformance with standard United States Patent practice.

Original claims 1-21 have been canceled and rewritten as claims 22-42 in order to eliminate the multiple dependencies and to conform the claims to standard United States patent practice.


An Abstract Of The Disclosure has been added as a separately typed page to be inserted after the claims.

Examination and allowance of claims 22-42 are respectfully requested.

Respectfully submitted,

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By


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MARKED-UP AMENDED SPECIFICATION PARAGRAPHS

Page 1, line 1, title

[Device and method for selecting and recording an image]

DEVICE AND METHOD FOR SELECTING AND RECORDING AN IMAGE

Page 2, paragraph starting at line 19

In a particular preferred embodiment the displaceable camera is rotatable [round] around two rotation axes substantially perpendicular to each other. The mirror can herein be disposed in stationary position. A selection can thus be made by directing the camera at the desired part of the reflected image of the object. The required angular displacement of the camera can be determined partly subject to the distance of the camera from the mirror. By means of this simple construction a part of the image of the object can be viewed without loss of image quality.

Page 2, paragraph starting at line 27

In another preferred embodiment the mirror is rotatable [round] around a single rotation axis for the purpose of reflecting a chosen part of the image of the object to a viewing area. In preference the camera is herein moreover displaceable in the viewing area substantially parallel to the rotation axis of the rotatable mirror. A desired part of the image of the object can also be selected with this preferred embodiment of the device according to the invention. The control of the camera is herein simpler than the control of the above described camera with two rotation axes since it has only one degree of freedom. In addition to simpler control of the camera, the mirror must however also be controlled in this preferred variant.

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Page 5, paragraph starting at line 8

In a preferred application of the method according to the invention the part of the reflected image to be viewed is selected by rotating the camera [round] around two rotation axes substantially perpendicular to each other. A desired part of the image of an object reflected by means of a for instance stationary mirror can thus be selected by limited angular displacement of the camera through two degrees of freedom. Selection takes place solely by directing the camera.

Page 5, paragraph starting at line 15

In another preferred application of the method according to the invention for reflecting an image of an object as according to step B), the mirror is rotated [round] around a single rotation axis such that a selected part of the image of the object is reflected by the mirror to a viewing area. The part to be viewed from the reflected image is preferably selected by displacing the camera substantially parallel to the rotation axis of the mirror in the viewing area. The desired part of the image is thus selected by rotating the mirror and displacing the camera. Although two elements have to be directed here, both have only to be displaced/rotated along one degree of freedom. The image of the object to be reflected to the viewing area can herein also be reflected by at least one stationary mirror as well as by the rotatable mirror. For the other advantages of this method reference is made to the advantages described above with reference to the device according to the invention.

Page 5, paragraph starting at line 30

[figure] Figure 1a [shows] is a schematic side view of a device according to the invention[.];

Page 6, paragraph starting at line 1

[figure] Figure 1b [shows] is a side view rotated through 90° relative to [figure] Figure 1a of the schematically shown device corresponding with that of [figure] Figure 1a[.];

Page 6, paragraph starting at line 3

[figure] Figure 2a [shows] is a side view of a rotatable mirror and translatable camera such as form part of the device according to the invention[,]; and

Page 6, paragraph starting at line 5

[figure] Figure 2b [shows] is a side view rotated through 90° of the camera and mirror as shown in [figure] Figure 2a.

Page 6, paragraph starting at line 8

Figure 1a shows a device 1 with an object holder 2 from which light is cast as according to arrow P1. The light emitted by object holder 2 is radiated to a stationary mirror 3 by an object (not shown in this figure) placed on object holder 2. Stationary mirror 3 reflects the light to a rotatable mirror 4 which can swivel [round] around a rotation axis 5 which coincides with the mirror surface of mirror 3. From rotatable mirror 4 a part of the light image reflects to a camera 6 which is displaceable along a guide 7 in a viewing area in a direction perpendicular to the drawing. Object holder 2, mirrors 3, 4 and camera 6 are placed in a housing 8 which prevents light emitted by object holder 2 disturbing/impeding users of device 1. The housing 8 shown schematically in this figure also forms the frame on which rotation axis 5 engages via a support 9 and to which stationary mirror 3 is connected via a support 10.

Page 6, paragraph starting at line 26

Figure 2a shows a more detailed side view of device 1 in which rotatable mirror 4 is suspended for rotation [round] around pins 11 in a frame 12. Also fixed to frame 12 is an electric motor 13 which engages on rotatable mirror 4 via ball hinges 14 and a drive rod 15. It is thus possible by operating servomotor 13 to vary the angular position of rotatable mirror 4. Figure 2b shows clearly that rotatable mirror 4 is likewise integrated with frame 12 via a support 16.

DEVICE AND METHOD FOR SELECTING AND RECORDING AN IMAGE**ABSTRACT OF THE DISCLOSURE**

The invention relates to a device for selecting and recording an image which forms a part of an irradiated or emissive object, comprising: an object holder for positioning the object, a mirror for reflecting an image of the object, and a displaceable camera for selecting a part of the image from the reflected image of the object. The invention also relates to a method for selecting an image to be recorded with a camera which forms a part of an irradiated or emissive object.

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Device and method for selecting and recording an image

5 The invention relates to a device and a method for selecting an image to be recorded with a camera which forms a part of an irradiated or emissive object.

10 For the analysis of DNA and RNA structures, proteins and so on use is made of camera boxes (also referred to as "imaging systems"). An object, generally in gel form such as a gel with nucleic acid or a gel with protein, is placed in such a camera box. The object is irradiated, for instance with light and preferably from the underside. It is also possible for the object, whether or not it is irradiated, to be emissive. A camera deployed above the object is placed in the correct position relative to the object to view and optionally enlarge radiation from a part of the object. It is noted with emphasis here that the part of the object to be viewed can also consist of the whole object. The positioning of the object in relation to the camera usually takes place by displacing the object holder on which the object lies in a plane perpendicular to the camera (x and y direction) until the desired object part lies below the camera. The desired image can then be recorded. A drawback of the existing camera boxes is that they are comparatively bulky and that the objects usually contain toxic substances with which an operative can come into contact during displacement of the object. A further drawback is that the object or preparation can be damaged during displacement thereof.

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25 The present invention therefore has for its object to provide an improved method and device for selecting an image to be recorded with a camera which forms a part of an irradiated or emissive object, with which it is possible to work with minimal risk of contamination through contact with toxic substances while retaining the optical resolution.

30 The invention provides for this purpose a device for selecting and recording an image which forms a part of an irradiated or emissive object, comprising: an object holder for positioning the object, a mirror for reflecting an image of the object, and a displaceable camera for selecting a part of the image from the reflected image of the object. The device preferably also comprises a radiation source for irradiating the object positioned

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by the object holder. Such a device has the significant advantage that it can take a relatively compact form. The construction height can be considerably smaller than in existing systems where a camera is arranged some distance above the object holder. This advantage will be further elucidated with reference to the annexed figures. Another significant advantage of the device according to the invention is that the object does not have to be moved to place the camera in the correct position relative to an object part. The chance of contamination of a user of the device with toxic substances, such as for instance carcinogens, is hereby limited considerably. Furthermore, the danger of the preparation being damaged as a result of positioning of the camera relative to the preparation is also considerably limited. Although systems do already exist wherein the object remains stationary and the image is herein positioned by digital zooming on the desired part of the object to be selected, these have the drawback of resulting in a considerable limitation of the resolution.

Because in the device according to the invention the object does not have to be displaced, the object holder can be given a stationary form, which results in a simplification of the construction and therefore saves costs compared to the prior art.

In a particular preferred embodiment the displaceable camera is rotatable round two rotation axes substantially perpendicular to each other. The mirror can herein be disposed in stationary position. A selection can thus be made by directing the camera at the desired part of the reflected image of the object. The required angular displacement of the camera can be determined partly subject to the distance of the camera from the mirror. By means of this simple construction a part of the image of the object can be viewed without loss of image quality.

In another preferred embodiment the mirror is rotatable round a single rotation axis for the purpose of reflecting a chosen part of the image of the object to a viewing area. In preference the camera is herein moreover displaceable in the viewing area substantially parallel to the rotation axis of the rotatable mirror. A desired part of the image of the object can also be selected with this preferred embodiment of the device according to

the invention. The control of the camera is herein simpler than the control of the above described camera with two rotation axes since it has only one degree of freedom. In addition to simpler control of the camera, the mirror must however also be controlled in this preferred variant.

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In a preferred embodiment the radiation source is disposed on the side of the object remote from the mirror. The object is thus X-rayed, which makes the device extremely suitable for analysis of DNA samples using a fluorescent medium. Use is generally made herein of a radiation source of 302 nm. This is however only one of the many possible ways in which the device according to the invention can be applied.

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The driving of the rotatable mirror and/or of the camera can take place manually using for instance a screw spindle, but it is also possible to realize these displacements by means of drive means such as for instance electric motors.

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In a particular preferred embodiment the device is also provided with linear guide means for guiding the camera. In the case of optional linear displacement of the camera it is important that the camera can be moved reciprocally in the viewing area in accurate manner, and it must moreover be possible to fix the camera at a precise position in order to record a determined image.

20

In another preferred embodiment the device is provided with an at least substantially radiation-sealed housing. Radiation sources with a wavelength in the order of magnitude of 302 nm can be applied in the device according to the invention, and these are harmful to the human eye. It is therefore recommended to prevent radiation originating from the radiation source from leaving the device. In addition, it is necessary to prevent ambient radiation (such as for instance ambient light) entering the housing, thereby causing the viewed image to become blurred/diminished.

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The rotatable mirror can take an elongate form so that the mirror casts a strip-like selected part of the image of the object to the viewing area. The length of the rotatable

mirror is herein preferably greater than the length of the object. The strip-like image can hereby originate from the whole length of the object. A selection can thus be made in one direction of the desired part of the image to be selected through the position of the mirror; in the preferred direction perpendicular thereto the selection must take place by
5 displacing the camera. It is generally remarked that the mirrors used in the device are preferably provided with a mirror surface placed on the front side, wherein the rotation axis of the mirror preferably coincides with the mirror surface. This is to prevent diminishing and/or deformation of the image being caused by the refractive index of the coating material with which the mirror surfaces may be covered or by rotation of the
10 mirror. It would be most obvious to give the mirrors a flat form but in order to obtain particular effects, such as for instance enlargement, it is also possible to give the mirror surfaces a curved form.

In another preferred embodiment the rotatable mirror, rotatable axis and drive means for
15 rotation of the mirror are integrated with the camera. The mirror does not have to have an elongate form in this preferred embodiment; through displacement of the camera the mirror in any case also displaces immediately.

Another option is that in addition to the rotatable mirror at least one additional
20 stationary mirror is disposed between the object and the camera. This enhances the construction possibilities; the camera can be placed at a position where it causes the least obstruction and it is possible to give the device an even more compact form.

It is noted that the optical axis of the image for recording preferably lies perpendicular
25 to the recording surface of the camera. Image distortion can thus be prevented, which leads to optimally quantifiable results.

The invention moreover provides a method for selecting an image to be recorded with a camera which forms a part of an irradiated or emissive object, by the steps of: a) placing
30 the object in stationary position, b) reflecting an image of an object with a mirror, and c) selecting with a displaceable camera a part of the image of the object to be viewed from

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the reflected image. The object placed in stationary position is preferably irradiated by a radiation source. It is recommended that the object be irradiated from the side of the object remote from the rotatable mirror. Using this method it is possible while retaining optical resolution to select a part of an image of an irradiated or emissive object with a limited danger of damage to the object. It is also possible to perform this method such that working conditions are less hazardous.

In a preferred application of the method according to the invention the part of the reflected image to be viewed is selected by rotating the camera round two rotation axes substantially perpendicular to each other. A desired part of the image of an object reflected by means of a for instance stationary mirror can thus be selected by limited angular displacement of the camera through two degrees of freedom. Selection takes place solely by directing the camera.

In another preferred application of the method according to the invention for reflecting an image of an object as according to step B), the mirror is rotated round a single rotation axis such that a selected part of the image of the object is reflected by the mirror to a viewing area. The part to be viewed from the reflected image is preferably selected by displacing the camera substantially parallel to the rotation axis of the mirror in the viewing area. The desired part of the image is thus selected by rotating the mirror and displacing the camera. Although two elements have to be directed here, both have only to be displaced/rotated along one degree of freedom. The image of the object to be reflected to the viewing area can herein also be reflected by at least one stationary mirror as well as by the rotatable mirror. For the other advantages of this method reference is made to the advantages described above with reference to the device according to the invention.

The invention will be further elucidated with reference to the non-limitative embodiments shown in the following figures. Herein:
figure 1a shows a schematic side view of a device according to the invention,

figure 1b shows a side view rotated through 90° relative to figure 1a of the schematically shown device corresponding with that of figure 1a,

figure 2a shows a side view of a rotatable mirror and translatable camera such as form part of the device according to the invention, and

5 figure 2b shows a side view rotated through 90° of the camera and mirror as shown in figure 2a.

Figure 1a shows a device 1 with an object holder 2 from which light is cast as according to arrow P1. The light emitted by object holder 2 is radiated to a stationary mirror 3 by
10 an object (not shown in this figure) placed on object holder 2. Stationary mirror 3 reflects the light to a rotatable mirror 4 which can swivel round a rotation axis 5 which coincides with the mirror surface of mirror 3. From rotatable mirror 4 a part of the light image reflects to a camera 6 which is displaceable along a guide 7 in a viewing area in a direction perpendicular to the drawing. Object holder 2, mirrors 3, 4 and camera 6 are
15 placed in a housing 8 which prevents light emitted by object holder 2 disturbing/impeding users of device 1. The housing 8 shown schematically in this figure also forms the frame on which rotation axis 5 engages via a support 9 and to which stationary mirror 3 is connected via a support 10.

20 Figure 1b shows device 1 in a side view rotated through 90° which shows more clearly that camera 6 is displaceable as according to arrow P2 along guide 7. By adjusting the angular position of rotatable mirror 4 and the position of camera 6 on guide 7 an image forming a part of an object located on object holder 2 can be selected without displacing the object on object holder 2.

25 Figure 2a shows a more detailed side view of device 1 in which rotatable mirror 4 is suspended for rotation round pins 11 in a frame 12. Also fixed to frame 12 is an electric motor 13 which engages on rotatable mirror 4 via ball hinges 14 and a drive rod 15. It is thus possible by operating servomotor 13 to vary the angular position of rotatable mirror
30 4. Figure 2b shows clearly that rotatable mirror 4 is likewise integrated with frame 12 via a support 16.

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Camera 6 is connected for translation to frame 12 by means of an upper guide 17 and a lower guide 18. In order to vary the position of camera 6 relative to frame 12 there is provided a servomotor 19 which drives a toothed wheel 20. This toothed wheel 20 engages on a rack 21 which is connected in stationary manner to frame 12. Servomotor 5 19 is fixed to a plate 22 which also bears camera 6. It is thus possible by operating servomotor 19 to displace camera 6 along guides 17, 18 and fix it in a desired position.

The description of figure 2b is analogous to that of figure 2a. This figure shows in addition a third servomotor 23 for optical zooming of camera 6. It is otherwise noted 10 that device 1 can be embodied with diverse types of camera; digital cameras are usually applied in practice for this purpose.

Although the invention is elucidated with reference to only a few embodiments, it will be apparent to all that the invention is by no means limited to the described and shown 15 embodiments. It will thus be apparent that the device can be applied to record diverse images. Examples hereof are the analysis of DNA and RNA structures, DNA chip technology as well as various other applications of image acquisition. Many more variations in application and construction are possible for the skilled person within the scope of the invention.

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Claims

1. Device for selecting and recording an image which forms a part of an irradiated or emissive object, comprising:
- 5 - an object holder for positioning the object,
- a mirror for reflecting an image of the object, and
- a displaceable camera for selecting a part of the image from the reflected image of the object.
- 10 2. Device as claimed in claim 1, wherein the displaceable camera is rotatable round two rotation axes substantially perpendicular to each other.
3. Device as claimed in claim 1 or 2, wherein the mirror is rotatable round a single rotation axis for the purpose of reflecting a chosen part of the image of the object to a
- 15 viewing area.
4. Device as claimed in claim 3, wherein the camera is displaceable in the viewing area substantially parallel to the rotation axis of the rotatable mirror.
- 20 5. Device as claimed in any of the foregoing claims, wherein the device also comprises a radiation source for irradiating the object positioned by the object holder.
6. Device as claimed in any of the foregoing claims, wherein the object holder takes a stationary form.
- 25 7. Device as claimed in any of the foregoing claims, wherein the radiation source is disposed on the side of the object remote from the mirror.
8. Device as claimed in any of the claims 3-7, wherein the device also comprises
- 30 drive means for rotating the mirror.

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9. Device as claimed in any of the foregoing claims, wherein the device also comprises drive means for displacing the camera.

5 10. Device as claimed in any of the claims 4-9, wherein the device also comprises substantially linear guide means for guiding the camera.

11. Device as claimed in any of the foregoing claims, wherein the device is provided with an at least substantially radiation-sealed housing.

10 12. Device as claimed in any of the claims 3-11, wherein the rotatable mirror has an elongate form.

13. Device as claimed in any of the claims 3-12, wherein the rotatable mirror, rotatable axis and drive means for rotation of the mirror are integrated with the camera.

15 14. Device as claimed in any of the claims 3-13, wherein at least one stationary mirror is disposed between the object and the camera in addition to the rotatable mirror.

20 15. Method for selecting an image to be recorded with a camera which forms a part of an irradiated or emissive object, by the steps of:

- A) placing the object in stationary position,
- B) reflecting an image of an object with a mirror, and
- C) selecting with a displaceable camera a part of the image of the object to be viewed from the reflected image.

25 16. Method as claimed in claim 15, wherein the part of the reflected image to be viewed is selected by rotating the camera round two rotation axes substantially perpendicular to each other.

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17. Method as claimed in claim 15, wherein in order to reflect an image of an object as according to step B) the mirror is rotated round a single rotation axis such that a selected part of the image of the object is reflected by the mirror to a viewing area.

5 18. Method as claimed in claim 17, wherein the part to be viewed from the reflected image is selected by displacing the camera substantially parallel to the rotation axis of the mirror in the viewing area.

10 19. Method as claimed in any of the claims 15-18, wherein the object placed in stationary position is irradiated with a radiation source.

20. Method as claimed in any of the claims 17-19, wherein the part of the image of the object to be reflected to the viewing area is also reflected by at least one stationary mirror as well as by the rotatable mirror.

15 21. Method as claimed in any of the claims 15-20, wherein the object is irradiated from the side of the object remote from the mirror.

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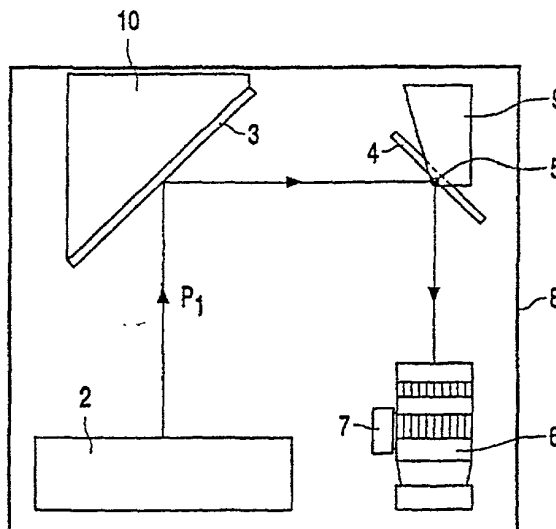
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(74) Agent: VAN DEN HEUVEL, Henricus, Theodorus; Octrooibureau LIOC, P.O. Box 1514, NL-5200 BN 's-Hertogenbosch (NL).		Published With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments. In English translation (filed in Dutch).	

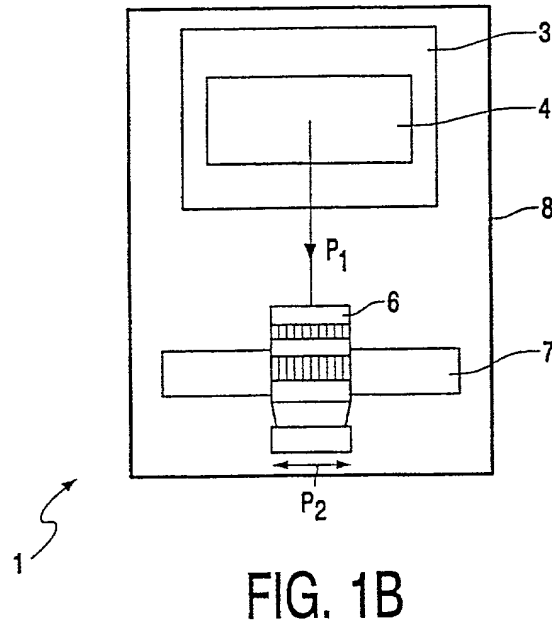
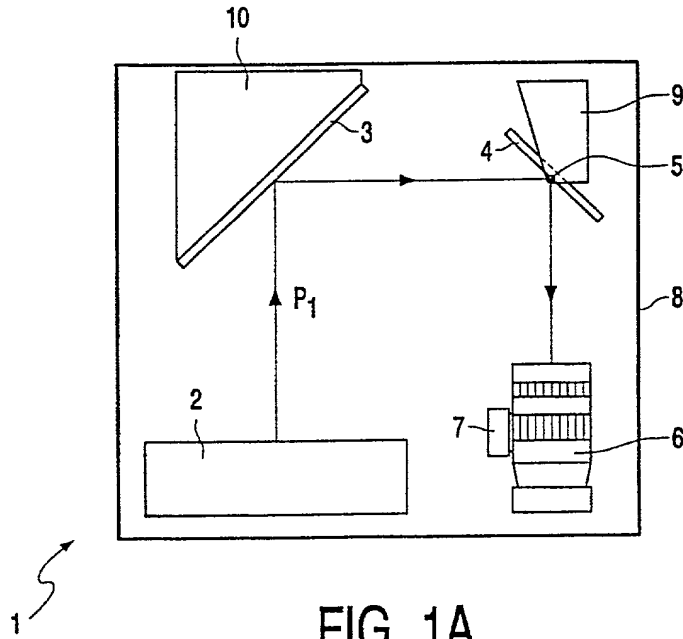
(54) Title: DEVICE AND METHOD FOR SELECTING AND RECORDING AN IMAGE

(57) Abstract

The invention relates to a device for selecting and recording an image which forms a part of an irradiated or emissive object, comprising: an object holder for positioning the object, a mirror for reflecting an image of the object, and a displaceable camera for selecting a part of the image from the reflected image of the object. The invention also relates to a method for selecting an image to be recorded with a camera which forms a part of an irradiated or emissive object.



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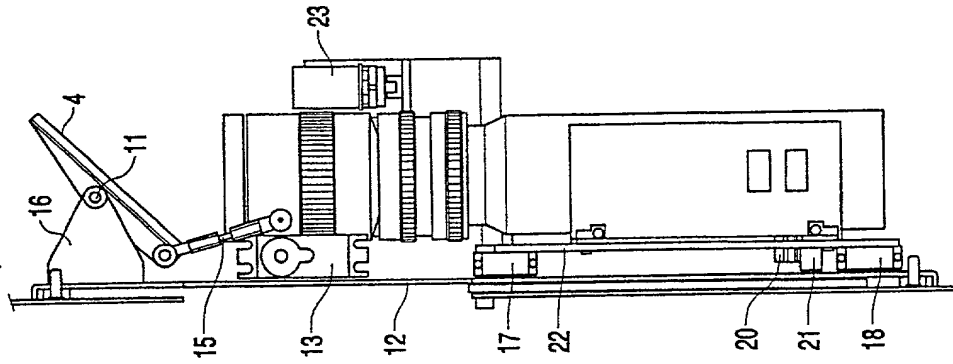


FIG. 2B

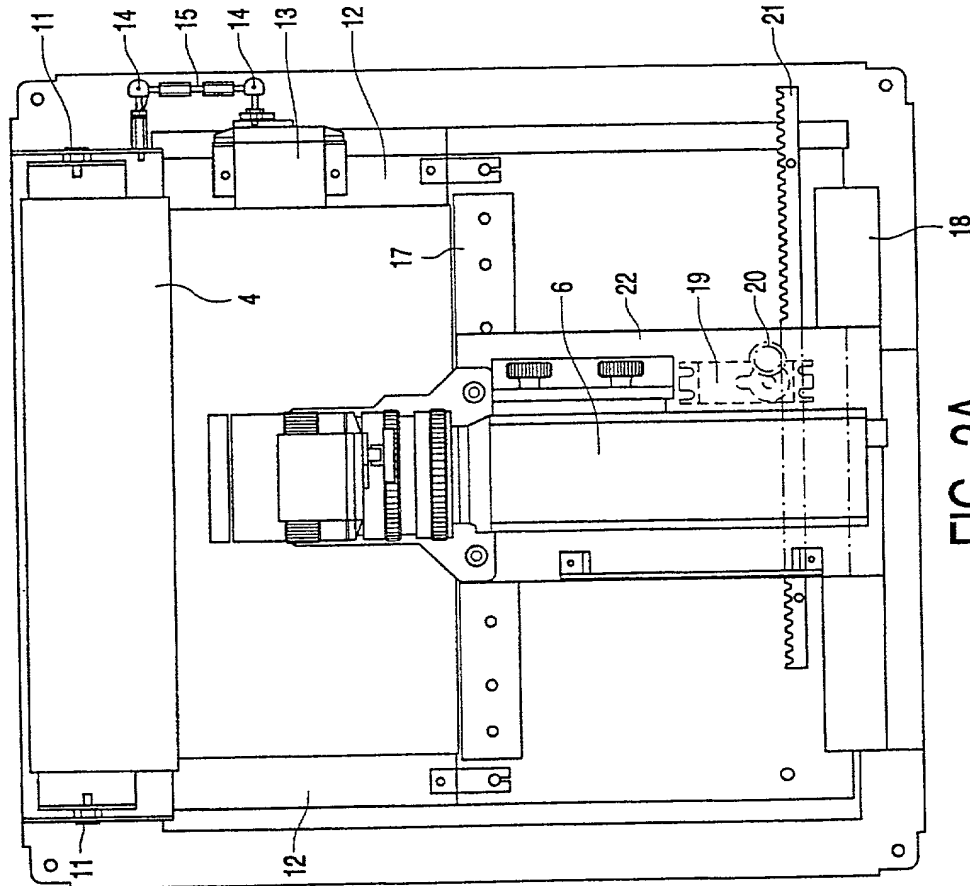


FIG. 2A

DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION
(Includes Reference to PCT International Applications)

ATTORNEY'S DOCKET
NUMBER

3135-011614

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Device and method for selecting and recording an image forming a part of an irradiated or emissive object

the specification of which (check only one item below):

- ☐ is attached hereto
- ☐ was filed as United States application
Serial No. _____
on _____
and was amended
on _____ (if applicable).
- ☒ was filed as PCT international application Number PCT/NL00/00202
on 24 March 2000
and was amended under PCT Article 19
on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the patentability of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby claim foreign priority benefits under Title 35, United State code, §119 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed:

PRIOR FOREIGN/PCT APPLICATION(S) AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. 119:

COUNTRY (of PCT indicate "PCT")	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY CLAIMED UNDER 35 USC 119
NL	1011664	24 March 1999 (24.03.99)	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO

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Page 1 of 2

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(Combined Declaration For Patent Application and Power of Attorney --PTO 1391 [13-11]--page 1 of 2)

COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY (CONTINUED)
(Includes Reference to PCT International Applications)

ATTORNEY CHECKED NUMBER

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PRIOR U.S. APPLICATIONS OR PCT INTERNATIONAL APPLICATIONS DESIGNATING THE U.S. FOR BENEFIT UNDER 35 U.S.C. 120:

U.S. APPLICATIONS		STATUS (Check One)		
U.S. APPLICATION NUMBER	U.S. FILING DATE	PATENTED	PENDING	ABANDONED

PCT APPLICATIONS DESIGNATING THE U.S.

PCT APPLICATION NO	PCT FILING DATE	U.S. SERIAL NUMBERS ASSIGNED (if any)		

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (List name and registration number)

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Pieter Tjerk Koopman

Date: 21-9-2001

Date: _____